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JC653 U.S. PTO

Please type a plus sign (+) inside this box → ☐PTO/SB/05 (4/98)  
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**UTILITY  
PATENT APPLICATION  
TRANSMITTAL**

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. 125/116  
First Inventor or Application Identifier Brady et al.  
Title IMPROVEMENTS IN AND RELATING TO CORROSION  
Express Mail Label No. EJ227695956US**APPLICATION ELEMENTS**

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ \* Fee Transmittal Form (e.g., PTO/SB/17)  
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 35]  
(preferred arrangement set forth below)
- Descriptive title of the Invention
  - Cross References to Related Applications
  - Statement Regarding Fed sponsored R & D
  - Reference to Microfiche Appendix
  - Background of the Invention
  - Brief Summary of the Invention
  - Brief Description of the Drawings (if filed)
  - Detailed Description
  - Claim(s)
  - Abstract of the Disclosure
3. ☐ Drawing(s) (35 U.S.C. 113) [Total Sheets ]
4. Oath or Declaration [Total Pages 3]
- a. ☒ Newly executed (original or copy)
- b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))  
(for continuation/divisional with Box 16 completed)
- i. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

**\* NOTE FOR ITEMS 1 & 13 IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).****ADDRESS TO:**Assistant Commissioner for Patents  
Box Patent Application  
Washington, DC 20231

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission  
(if applicable, all necessary)
- a. ☐ Computer Readable Copy
- b. ☐ Paper Copy (identical to computer copy)
- c. ☐ Statement verifying identity of above copies

**ACCOMPANYING APPLICATION PARTS**

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement of Power of Attorney  
(when there is an assignee)
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)  
(Should be specifically itemized)
13. ☐ \* Small Entity Statement(s) ☐ Statement filed in prior application  
(PTO/SB/09-12) ☐ Status still proper and desired
14. ☐ Certified Copy of Priority Document(s)  
(if foreign priority is claimed)
15. ☐ Other: \_\_\_\_\_

**16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:**☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: \_\_\_\_\_

Prior application information: Examiner \_\_\_\_\_ Group / Art Unit: \_\_\_\_\_

**For CONTINUATION or DIVISIONAL APPS only:** The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.**17. CORRESPONDENCE ADDRESS**☐ Customer Number or Bar Code Label

(Insert Customer No. or Attach bar code label here)

or ☒ Correspondence address below

Name	Richard E. Jenkins				
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	3100 Tower Boulevard				
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Country	USA	Telephone	001-919-493-8000	Fax	001-919-419-0383

Name (Print/Type)	Richard E. Jenkins	Registration No. (Attorney/Agent)	28,428
Signature	Richard E. Jenkins	Date	9-22-00

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

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**FEE TRANSMITTAL**  
**for FY 2000**Patent fees are subject to annual revision.  
Small Entity payments must be supported by a small entity statement,  
otherwise large entity fees must be paid. See Forms PTO/SB/09-12.  
See 37 C.F.R. §§ 1.27 and 1.28.**TOTAL AMOUNT OF PAYMENT** (\$)**505.00****Complete if Known**

Application Number	
Filing Date	
First Named Inventor	Arthur Albert Brady
Examiner Name	
Group / Art Unit	
Attorney Docket No.	125/116

**METHOD OF PAYMENT** (check one)

- 1.
- ☐
- The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number Deposit Account Name ☐ Charge Any Additional Fee Required  
Under 37 CFR §§ 1.16 and 1.17

- 2.
- ☒
- Payment Enclosed:**

☒ Check ☐ Money Order ☐ Other**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
101 690	201 345	Utility filing fee	345.00
106 310	206 155	Design filing fee	
107 480	207 240	Plant filing fee	
108 690	208 345	Reissue filing fee	
114 150	214 75	Provisional filing fee	

**SUBTOTAL (1)** (\$)**345.00****2. EXTRA CLAIM FEES**

Total Claims	Extra Claims	Fee from below	Fee Paid
29	-20** = 9	9	81
4	-3** = 1	39	39
			0

\*\*or number previously paid, if greater; For Reissues, see below


Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
103 18	203 9	Claims in excess of 20	
102 78	202 39	Independent claims in excess of 3	
104 260	204 130	Multiple dependent claim, if not paid	
109 78	209 39	** Reissue independent claims over original patent	
110 18	210 9	** Reissue claims in excess of 20 and over original patent	

**SUBTOTAL (2)** (\$)**120.00****FEE CALCULATION** (continued)**3. ADDITIONAL FEES**

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
105 130	205 65	Surcharge - late filing fee or oath	0.00
127 50	227 25	Surcharge - late provisional filing fee or cover sheet.	0.00
139 130	139 130	Non-English specification	0.00
147 2,520	147 2,520	For filing a request for reexamination	0.00
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	0.00
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	0.00
115 110	215 55	Extension for reply within first month	0.00
116 380	216 190	Extension for reply within second month	0.00
117 870	217 435	Extension for reply within third month	0.00
118 1,360	218 680	Extension for reply within fourth month	0.00
128 1,850	228 925	Extension for reply within fifth month	0.00
119 300	219 150	Notice of Appeal	0.00
120 300	220 150	Filing a brief in support of an appeal	0.00
121 260	221 130	Request for oral hearing	0.00
138 1,510	138 1,510	Petition to institute a public use proceeding	0.00
140 110	240 55	Petition to revive - unavoidable	0.00
141 1,210	241 605	Petition to revive - unintentional	0.00
142 1,210	242 605	Utility issue fee (or reissue)	0.00
143 430	243 215	Design issue fee	0.00
144 580	244 290	Plant issue fee	0.00
122 130	122 130	Petitions to the Commissioner	0.00
123 50	123 50	Petitions related to provisional applications	0.00
126 240	126 240	Submission of Information Disclosure Stmt	0.00
581 40	581 40	Recording each patent assignment per property (times number of properties)	40.00
146 690	246 345	Filing a submission after final rejection (37 CFR § 1.129(a))	0.00
149 690	249 345	For each additional invention to be examined (37 CFR § 1.129(b))	0.00
		Other fee (specify)	0.00
		Other fee (specify)	0.00

\*Reduced by Basic Filing Fee Paid

**SUBTOTAL (3)** (\$)**40.00****SUBMITTED BY**

Name (Print/Type)	Richard E. Jenkins	Registration No. (Attorney/Agent)	28,428	Telephone	001-919-493-8000
Signature		Date	9-22-00		

**WARNING:**

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September 22, 2000

"Express Mail" mailing number EJ227695956US  
Date of Deposit 22 September 2000  
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner for Patents, Washington, D.C. 20231  
Lillian S. Glenn Lillian S. Glenn

Commissioner for Patents  
BOX PATENT APPLICATION  
Washington, D.C. 20231

Re: U.S. Patent Application for IMPROVEMENTS IN AND  
RELATING TO CORROSION INHIBITING FORMULATIONS  
which claims priority to UK 9924358.6 filed 10/14/99  
Our File No. 125/116

Sir:

Please find enclosed the following:

1. A U.S. patent application for IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING FORMULATIONS (35 pages);
2. Preliminary Amendment (2 pages);
3. An executed Declaration (3 pages);
4. An unexecuted Small Entity Statement (2 pages);
5. An executed Assignment (2 pages);
6. Recordation Form Cover Sheet (PTO-1595; 1 page);
7. Utility Patent Application Transmittal (Form PTO/SB/05; 1 page);
8. Fee Transmittal (Form PTO/SB/17; 1 page) in duplicate;

Commissioner for Patents  
September 22, 2000  
Page 2

9. A check in the amount of \$505.00 to cover the small entity application filing fee (\$465.00) and the assignment recordation fee (\$40.00);
10. A return-receipt postcard to be returned to our offices with the U.S. Patent and Trademark date stamp thereon; and
11. A Certificate of Express Mail No.: EJ227695956US.

Please contact our offices if there are any questions with respect to this matter.

Respectfully submitted,

JENKINS & WILSON, P.A.



Richard E. Jenkins  
Registration No.: 41,085

REJ/lsg

Enclosures

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:     Brady, Arthur Albert; Clubley, Brian George

Application No.:

Filed on:

Title:                    IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING  
                                 FORMULATIONS

**STATEMENT CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(b))--SMALL BUSINESS CONCERN**

I hereby state that I am an official of the small business concern empowered to act on behalf of the concern identified below:

BRAD-CHEM TECHNOLOGY LIMITED  
Unit C4, Moss Industrial Estate  
Leigh, Lancs WN7 3PT  
UNITED KINGDOM

I hereby state that the above identified small business concern qualifies as a small business concern, as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office under Sections 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third-party or parties controls or has the power to control both.

I hereby state that rights under contract or law have been conveyed to, and remain with, the small business concern identified above, with regard to the invention described in the specification filed herewith, with title as listed above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below\* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c), if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

No such person, concern, or organization exists.

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of

the issue fee or any maintenance fee due after the date on which status as a small business entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed..

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

Brad-Chem Technology Limited  
Unit C4, Moss Industrial Estate  
Leigh, Lancs WN7 3PT  
UNITED KINGDOM

SIGNATURE \_\_\_\_\_

Date \_\_\_\_\_

"Express Mail" mailing number EJ227695956US  
Date of Deposit 22 September 2000  
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Lillian S. Glenn

Lillian S. Glenn

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Brady et al.

Group Art Unit:

Serial No.:

Examiner:

Filed:

Docket No.: 125/116

For: IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING FORMULATIONS

\*\*\*\*\*

PRELIMINARY AMENDMENT

Commissioner for Patents  
BOX PATENT APPLICATION  
Washington, D.C. 20231

Sir:

AMENDMENTS

Kindly amend the subject application as follows:

IN THE CLAIMS:

Claim 10, lines 2 and 3, please delete the phrase "any one of the preceding claims" and insert in place thereof --claim 1--.

Claim 27, lines 1 and 2, please delete the phrase "any one of the preceding claims" and insert in place thereof --claim 1--.

Claim 29, lines 2 and 3, please delete the phrase "any one of claims 1-9" and insert in place thereof --claim 1--.

REMARKS

The amendments to the claims as set forth above are intended to remove all multiple dependent claims from the subject application and to more particularly point out and distinctly claim the subject invention.

Respectfully submitted,

JENKINS & WILSON, P.A.

Date: 9-22-00 By: Richard E. Jenkins  
Richard E. Jenkins  
Reg. No.: 28,428

Suite 1400 University Tower  
3100 Tower Boulevard  
Durham, North Carolina 27707  
Telephone: (919) 493-8000

125/116 REJ/lsg



I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231. Katrina T. Holland, Lillian S. Glenn, Lynette M. Bailey, Amy J. Martin, Karen S. Schuller, Page E. Snyder.

*William S. Glenn*

1

## IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING FORMULATIONS

### Field of the Invention

5

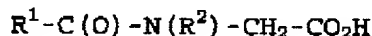
The present invention relates to improvements in and relating to corrosion inhibiting formulations.

### Background of the Invention

10

A wide variety of additives have been developed and are in commercial use for the protection of metals against corrosion in organic or aqueous media.

15 Amongst ferrous metal corrosion inhibitors, carboxylic acids are widely used, for example, those with long chain alkyl or aryl groups which impart solubility to the carboxylic acids in organic systems, for example hydrocarbon oils. Particularly effective compounds are  
20 acyl amino acids of structure (I):



(I)

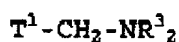
25

where  $R^1$  is a long chain alkyl group and  $R^2$  is hydrogen or methyl.

Where water solubility is required, it is common practice  
30 to employ a water soluble salt of the carboxylic acid, for example, a sodium salt or a trialkanolamine salt.

2

Amongst non-ferrous metal corrosion inhibitors (also known as metal passivators or deactivators), the most widely used compounds for protection of copper and copper alloys are triazole derivatives, particularly benzotriazole or  
5 tolutriazole. As above, derivatives are well known which enhance solubility in organic hydrocarbons or water. For example structures of formula (II) are in commercial use:



10

(II)

where  $T^1$  is a triazole derivative,  $R^3$  is hydroxyalkyl (for water solubility) or alkyl (for oil solubility).

15

When ferrous metal and non-ferrous metal corrosion inhibition are both required in an oil-based medium two oil-soluble corrosion inhibitors are used. Similarly, when both ferrous metal and non-ferrous metal corrosion  
20 inhibitors are required in an aqueous medium, two water-soluble corrosion inhibitors are used.

However, in a number of applications, solubility of the corrosion inhibitor in both organic hydrocarbons and water  
25 is desirable. Such applications include, but are not limited to, those involving emulsions or those where water may be present as a contaminant of oil systems and vice versa. Applications where dual solubility would be of utility include, but are not limited to, industrial oils,  
30 crankcase lubricants, metalworking fluids, hydraulic fluids, rolling oils, brake fluids, fuel systems, surface coatings and water-soluble paints.

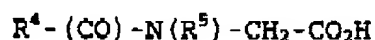
In an effort to reduce the amount of organic hydrocarbon material used in many technologies, aqueous emulsion formulations are being developed so that the range of technical areas in which emulsions will have importance is increasing. However, the conventional corrosion inhibition compounds described above result in either organic solubility or water solubility.

It is an aim of preferred embodiments of the present invention to provide an improved corrosion inhibitor.

#### Summary of the Invention

According to a first aspect of the present invention there is provided a formulation comprising:

a) an acyl amino acid derivative of the formula (III):



(III)

in which

$R^4$  is  $C_6 - C_{30}$  optionally substituted alkyl

and  $R^5$  is hydrogen or methyl, and

b) a  $N,N'$ -disubstituted aminomethyl triazole derivative of the formula (IV):



(IV)

in which

T<sup>2</sup> is an optionally substituted 1,2,3-benzotriazole group,  
or an optionally substituted 1,2,4-triazole group, and

5

R<sup>6</sup> is a hydroxyalkyl group.

It has surprisingly been found that formulations in  
accordance with the present invention are soluble in both  
10 oil and water and give corrosion protection to a range of  
metals.

Suitably, the acyl amino acid derivative of formula (III)  
is organic hydrocarbon-soluble.

15

Suitably, the N,N'-disubstituted aminomethyl triazole  
derivative of formula (IV) is water-soluble.

Generally, unless otherwise stated herein or unless the  
20 context requires otherwise, any alkyl may be either a  
straight or branched chain alkyl. Except where otherwise  
stated in this specification optional substituents of an  
alkyl group may include, aryl, alkenyl, or alkoxy ether  
groups. Except where otherwise stated in this  
25 specification the alkyl group may optionally be  
interrupted, for example, by an unsaturated linkage and/or  
an oxygen. Each alkyl group may comprise one or more  
substituents. Suitably, alkyl groups are unsubstituted.

30 Preferably, R<sup>4</sup> is C<sub>10</sub>-C<sub>20</sub> alkyl. More preferably R<sup>4</sup> is  
C<sub>11</sub>C<sub>17</sub> alkyl. Especially preferred R<sup>4</sup> groups are C<sub>11</sub>H<sub>23</sub>  
derived from lauric acid and C<sub>17</sub>H<sub>33</sub> derived from oleic  
acid.

Preferably  $R^5$  is methyl. Preferably,  $R^5$  is an unsubstituted methyl group.

- 5 Generally, unless otherwise stated herein or unless the context requires otherwise, any benzotriazole group may be optionally substituted by one or more alkyl groups. Suitable substituents include  $C_1$ - $C_4$  alkyl groups. A benzotriazole group may comprise four substituents or  
10 less. Suitably, a benzotriazole group comprises three substituents or less, preferably two substituents or less and more preferably one substituent or less. Suitably, a benzotriazole group is unsubstituted. Suitably, alkyl group substituents of benzotriazole groups are  
15 unsubstituted.

Preferably,  $T^2$  is a 1,2,3-benzotriazole group. More preferably  $T^2$  is a benzotriazole or tolutriazole.

- 20 Suitably,  $R^6$  is a hydroxyalkyl group containing from 1-4 carbon atoms. Suitably,  $R^6$  is a hydroxyalkyl group containing from 1-4 hydroxyl groups. Suitably, the hydroxyalkyl group comprises an unsubstituted hydroxyalkyl group. Preferably,  $R^6$  is 2-hydroxyethyl or hydroxypropyl  
25 most preferably  $R^6$  is 2-hydroxyethyl. The  $R^6$  groups of formula (IV) may comprise the same or different hydroxyalkyl group.

- Suitably, the formulation is soluble in organic  
30 hydrocarbons. Suitably the formulation is soluble in water. Preferably, the formulation is soluble in both organic hydrocarbons and water.

Generally, unless otherwise stated herein or otherwise required by the context, a formulation is soluble in organic hydrocarbons if at 25°C and 1 atmosphere pressure it has a solubility of at least 0.000001wt%, suitably at least 0.0001wt%, preferably at least 0.01wt%, more preferably at least 0.5wt% and particularly at least 1.0wt% in Naphthenic oil. The naphthenic oil is suitably Nynas T22 (trade mark) available from Nynas Naphthenics Ltd.

10

Generally unless otherwise stated herein or otherwise required by the context, a formulation is soluble in organic hydrocarbons if at 25°C and 1 atmosphere pressure it has a solubility of at least 0.000001wt%, suitably at least 0.0001wt%, preferably at least 0.01wt%, more preferably at least 0.5wt% and particularly at least 1.0wt% in toluene.

Generally, unless otherwise stated herein or otherwise required by the context, a formulation is soluble in water if at 25°C and 1 atmosphere pressure it has a solubility of at least 0.000001wt%, suitably at least 0.0001wt%, preferably at least 0.01wt%, more preferably at least 0.5wt% and particularly at least 1.0wt% in water. The water used to determine solubility is suitably laboratory grade de-ionised water.

Solubility should be tested by preparing a mixture of the appropriate concentration of formulation to solvent, warming the mixture, with stirring, at 40-50°C for approximately 15 minutes. The mixture should then be left to stand overnight at ambient temperature and then

visually inspected to ascertain whether or not complete solution has been obtained.

The formulation may comprise more than one acyl amino acid derivative of the formula (III). The formulation may comprise more than one N,N'-disubstituted aminomethyl triazole derivative of the formula (IV).

Especially preferred mixtures are those from combination of N-oleoyl sarcosine and bis (2-hydroxyethyl) amino methyl tolutriazole, N-oleoyl sarcosine and bis (2-hydroxyethyl) amino methyl benzotriazole, N-lauroyl sarcosine and bis (2-hydroxyethyl) amino methyl tolultriazole and N-lauroyl sarcosine and (2-hydroxyethyl) amino methyl benzotriazole.

The optimum ratio of compound (III) to compound (IV) will depend on the degree of solubility required in each solvent. For example, higher levels of compound (III) will generally increase solubility in organic hydrocarbons and higher levels of compound (IV) will generally increase solubility in water.

The formulation may comprise less than 99wt%, less than 95%, less than 80wt% or less than 55wt% of the acyl amino acid of formula (III).

The formulation may comprise greater than 1wt%, greater than 5wt%, greater than 20wt% and greater than 45wt% of the acyl amino acid of formula (III).

8

The formulation may comprise less than 99wt%, less than 95wt%, less than 80wt%, less than 55wt% of the N,N'-disubstituted aminomethyl triazole of formula (IV).

- 5 The formulation may comprise greater than 1wt%, greater than 5wt%, greater than 20wt% and greater than 45wt% of the N,N'-disubstituted aminomethyl triazole of formula (IV).
- 10 The mole ratio of compound (III) to compound (IV) is suitably between 1 : 0.2 and 1 : 2, preferably between 1 : 0.5 and 1 : 1 and more preferably between 1 : 0.6 and 1 : 0.9.
- 15 The formulation may further comprise minor amounts of additional additives. Suitably, the formulation comprises less than 10wt%, preferably less than 5wt% and more preferably less than 1wt% in total of additional additives.
- 20 Non-limiting examples of additional additives are:
- phenolic or aminic antioxidants, further corrosion or rust inhibitors, further metal deactivators, extreme
- 25 pressure/antiwear additives, viscosity index improvers, pour point depressants, dispersants/surfactants, antifoams, biocides, complexing agents.

Non-limiting examples of suitable phenolic antioxidants

30 are:

2,6-di-t-butyl phenol derivatives, 2-t-butyl-6-methyl phenol derivatives.



Non-limiting examples of suitable aminic antioxidants are:

- alkylated diphenylamine derivatives and alkylated a-  
5 naphthylamine derivatives.

Non-limiting examples of suitable corrosion  
inhibitors/rust inhibitors are:

- 10 alkyl or aryl mono, di or poly carboxylic acids and their  
ammonium salts, amine alkanolamine or metal salts, alkenyl  
succinic acid and derivatives, aryl sulphonic acid salts,  
phosphoric acid, poly phosphoric acids and derivatives,  
phosphoric acids, fatty acid alkanolamides, imidazoline  
15 derivatives.

Non-limiting examples of suitable metal de-activators are:

- 1,2,4-triazole derivatives, benzotriazole and alkylated  
20 benzotriazole derivatives, mercaptobenzothiazole and its  
sodium salt.

Non-limiting examples of suitable extreme  
pressure/antiwear additives are:

- 25 zinc dialkyl dithiophosphates, amine salts of substituted  
phosphoric acid derivatives, triphenyl phosphorothioate  
and alkylated derivatives, molybdenum dithiocarbamate  
derivatives, tri-aryl phosphates, sulphurised hydrocarbons  
30 e.g. vegetable oils.

Non limiting examples of suitably viscosity index  
improvers/pour depressants are:

polyacrylates, polymethacrylates, olefin co-polymers, styrene-acrylate co-polymers, alkylated naphthalene derivatives.

5

Non-limiting examples of suitable dispersants/surfactants are:

polybutenyl succinic acid amides, basic magnesium, calcium and barium sulphonates and phenolates.

10

Non-limiting examples of suitable antifoams are:

polysiloxanes, ethylene/propylene oxide co-polymers.

15

Non limiting examples of suitable biocides are:

isothiazolone derivatives, boron amide derivatives.

20 Non-limiting examples of suitable complexing agents are:

ethylene diamine tetra-acetic acid and derivatives, citric acid.

25 Compounds (III) and compounds (IV) are commercially available or may be prepared by conventional methods as described in the scientific literature. For example, compounds (III) may be prepared by reaction of an appropriate acyl chloride with an appropriate amino acid.

30 Compounds (IV) may be prepared by reacting an appropriate triazole derivative with formaldehyde and a hydroxyl-containing secondary amine by the Mannich reaction.

According to a second aspect of the invention there is provided a composition comprising:

- 5 a) a formulation according to the first aspect of the invention and

b) a diluent.

- 10 Suitable diluents include water, organic hydrocarbons or a mixture thereof.

Suitable organic hydrocarbons include natural or synthetic aliphatic or aromatic compounds of carbon and hydrogen, optionally containing unsaturated linkages, ester groups or hetero atoms e.g. oxygen. Non-limiting examples of suitably organic hydrocarbons are:

- octane, kerosine, white spirit, petroleum-based hydrocarbons such as naphthenic oils or paraffinic oils, vegetable oils, synthetic carboxylic acid ester, phosphate esters, poly  $\alpha$  olefins, poly isobutylenes, alkylated aromatic hydrocarbons, ethylene glycol, propylene glycol, polyalkylene glycols, glycol ethers.

25

The water according to the second aspect of the invention may be distilled water, de-ionised water, natural water or synthetic hard water, for example.

- 30 Preferably, the diluent comprises one or more of water, glycols or mineral oils. More preferably, the diluent comprises propylene glycol and/or naphthenic oil.

12

The composition of the second aspect of the invention advantageously provides the formulation of the first aspect of the invention in a form which may facilitate use and/or handling thereof.

5

The composition of the second aspect of the invention may be manufactured by mixing the formulation of the first aspect of the invention with the diluent. Alternatively, or in addition, the composition of the second aspect of the invention may be provided by preparing the formulation of the first aspect in the presence of the diluent.

10

The composition according to the second aspect of the invention may be further diluted in use, by addition of any of the diluents listed above.

15

The composition according to the second aspect of the invention may comprise at least 5wt% and suitably at least 20wt% of the formulation according to the first aspect.

20

The composition according to the second aspect of the invention may comprise less than 95wt%, suitably less than 90wt% of the formulation according to the first aspect.

25 The composition according to the second aspect of the invention may comprise at least 5wt% and suitably at least 20wt% diluent.

30 The composition according to the second aspect of the invention may comprise less than 95wt% and suitably less than 90wt% diluent.

13

The composition may comprise further additives. Suitably, the composition may comprise 5wt%, or 3wt% or 1wt% or less of further additives.

5 According to a third aspect of the present invention there is provided a composition in accordance with the second aspect of the invention in contact with a ferrous metal surface, a non-ferrous metal surface, or a combination thereof.

10

Non-limiting examples of suitable metals are:

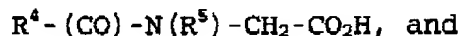
iron, copper, aluminium, magnesium, zinc, cobalt, tin and mixtures and/or alloys thereof.

15

According to a fourth aspect of the present invention there is provided a kit comprising

20

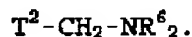
(a) an acyl amino acid derivative of a formula (III) compound:



(III)

25

(b) a N,N'-disubstituted aminomethyl triazole derivative of a formula (IV) compound:



30

(IV)

14

The kit may comprise components (a) and (b) in such a ratio, that when mixed together, the resulting combination is soluble in water, organic hydrocarbons or a mixture thereof.

5

The kit may further comprise a solvent comprising water and/or organic hydrocarbon or a mixture thereof.

According to a fifth aspect of the present invention there is provided a method of producing a formulation comprising contacting:

(a) an acylamino acid derivative of formula (III),

15 
$$R^4 - (CO) - N(R^5) - CH_2 - CO_2H, \text{ and}$$

(III)

(b) a N,N'-disubstituted aminomethyl triazole derivative  
20 of formula (IV),

$$T^2 - CH_2 - NR^6_2.$$

(IV)

25

Suitably, (a) and (b) are contacted in such a ratio that the resulting mixture is soluble in water, organic hydrocarbons or a mixture thereof.

30 Suitably, (a) and (b) are contacted by mixing with stirring at an elevated temperature. Temperatures from room temperature to 100°C may be employed, but preferably the temperature is kept below 50°C.

15

Mixing times may vary from a few minutes to several hours. Suitably, the mixing time is at least 1 minute, preferably at least 5 minutes and more preferably at least 10

5 minutes. Suitably, the mixing time is less than 3 hours, preferably less than 2 hours and more preferably less than 1 hour. Suitably, mixing times are between 10-30 minutes.

The mixing step may further include addition of a solvent.

10 Suitably, a solvent is added to the compounds before stirring at an elevated temperature. Alternatively, or in addition, a solvent may be added after the process of stirring at an elevated temperature. Alternatively, or in addition, a solvent is added during the process of  
15 stirring at an elevated temperature. Suitable solvents include water, organic hydrocarbons or a mixture thereof.

According to a sixth embodiment of the present invention there is provided use of a formulation according to one of  
20 the preceding aspects of the invention as a corrosion inhibitor, as a rust inhibitor, as a metal passivator, as a metal deactivator, or as a multipurpose additive for a combination of the aforementioned purposes. The formulation may also be used as an emulsifier or as a  
25 surfactant.

Suitably, the formulation is used in a concentration sufficient to be effective in inhibiting corrosion. The effective levels of formulation will vary depending on the  
30 application. Suitably, concentrations of between 0.000001wt% and 5wt% are used, preferably concentrations of between 0.05wt% and 2wt% are used.

16

The use according to the sixth embodiments of the invention may be in:

hydrocarbon, synthetic and water-based hydraulic fluids,  
5 gear oils, chain oils, circulating oils, turbine oils,  
crankcase oils, compressor oils, bearing lubricants, wire  
drawing lubricants, soluble oils, oil-based metalworking  
fluids, metalworking fluid emulsions, grinding fluids,  
heat transfer oils, electrical insulating oils, greases,  
10 brake fluids, fuels, engine coolants, refrigeration  
lubricants, surface cleaners, fountain solutions, aircraft  
de-icing fluids, de-watering fluids, penetrating fluids,  
polishes, adhesives, water-based paints, industrial  
cooling water systems, and solutions used in the  
15 electronics industry for printed circuit board  
manufacture.

According to a seventh embodiment of the invention there  
is provided a method of inhibiting corrosion of a metal  
20 comprising contacting a formulation according to the first  
aspect of the invention and a fluid, which fluid contacts  
a metal susceptible to corrosion.

Any aspect of the invention may be combined with any one  
25 or more other aspect of the invention.

Formulations in accordance with the present invention find  
utility in a wide range of industrial oil, fuel, water,  
emulsion-based and surface coating systems where corrosion  
30 protection of a range of one or more metals is required.

#### Examples



17

The following examples further illustrate, but do not limit, the present invention. Unless otherwise indicated, parts and percentages are by weight.

- 5 Sample formulations in accordance with the present invention were prepared. Formulations outside the present invention were also prepared for comparative purposes. The formulations were then tested for solubility and corrosion inhibition properties.

10

#### Examples 1-15

Details of example formulations in accordance with the invention are given in Table 1 as Examples 1-15.

15

The formulations of Examples 1-15 were prepared by mixing the appropriate amounts of compounds of type (III) and compounds of type (IV) in a 100ml glass conical flask and warming at 40-50°C, with stirring, for approximately 15  
20 minutes.

20

Triazole derivative A is water-soluble commercial product containing bis (hydroxyethyl) aminomethyl tolutriazole isomers, sold by Ciba Specialty Chemicals under the trade  
25 name Irgamet 42 (RTM). It includes 25wt% of water.

25

Triazole derivative B is Irgamet 42 (RTM) as referred to above, after substantially all of the water has been removed by vacuum stripping up to 50°C.

30

Examples 16 and 17 illustrate preparation of a composition according to the second aspect of the invention.

**Example 16**

9.33 parts of water-soluble triazole derivative A are dissolved in 150 parts of de-ionised water and the  
5 solution warmed to 40°C, with stirring in a 250ml beaker.  
14.13 parts of N-oleoyl sarcosine, sold by Ciba Speciality Chemicals, are then added to the solution of triazole derivative A over approximately 10 minutes. The mixture is stirred at 40°C for a further 10 minutes and allowed to  
10 cool. The resulting product is a clear, pale yellow solution containing 13.5% solids.

**Example 17**

15 10.09 parts of N-oleoyl sarcosine are dissolved in 150 parts of toluene and the solution warmed to 40°C, with stirring in a 250ml beaker. 5.0 parts triazole derivative A are then added over approximately 10 minutes. The mixture is stirred at 40°C for a further 10 minutes and  
20 allowed to cool. The resulting product is a clear, pale yellow solution containing 9.1% solids.

**Comparative Examples 18-22**

25 Details of the formulations of Comparative Examples 18-22 are given in Table 2:

The formulations of Examples 18-22 are prepared by mixing the appropriate amounts of carboxylic acid and base in a  
30 100ml glass conical flask and warming at 40-50°C, with stirring, for approximately 15 minutes. In these Examples, either Compound (III) or Compound (IV) of the

invention is replaced by closely related compounds outside the invention.

### Solubility Testing

5

The results of solubility testing of Examples 1-15 and Comparative Examples 18-22 in water and in naphthenic oil, are shown in Table 3. The results of solubility testing of Examples 2, 3, 6 and 8 in other solvents are shown in  
10 Table 4.

15

To test the solubility of a formulation, solutions of each formulation having a range of concentrations for each of Examples 1-15 and Comparative Examples 18-22 of, for example, 0.5%, 1.0%, 5.0%, 20% were prepared. Preparation involved taking the relevant amount of each Example formulation, mixing it with the appropriate amount of solvent to get the desired concentration and warming the solutions with stirring at 40-50°C, for approximately 15  
20 minutes.

25

The solutions were then allowed to stand overnight at room temperature and then visually inspected to see if complete solution had occurred. For example, solubilities described as > 1.0% mean that 1.0% solutions are completely soluble. Solubilities described as < 1.0% meant that 1.0% solutions are not completely soluble.

30

Examination of Tables 3 and 4 shows that formulations according to invention show solubility in both water and naphthenic oil. The results also show formulations in accordance with the invention exhibit solubility in

20

solvents with polarities ranging from water to paraffinic mineral oil.

The comparative examples do not show dual solubility,

- 5 being soluble either in organic hydrocarbon or water, or neither, but not both.

#### Corrosion Inhibitor/Metal Passivator Testing

- 10 The results of testing of formulations in accordance with the invention for corrosion inhibition are given in Table 5. Details of the test methods are given below.

#### Ferrous metal corrosion testing

15

##### (1) Coupon Test

- A 70mm x 40mm mild steel test coupon is cleaned by polishing with silicon carbide abrasive paper and  
20 degreased by immersion in toluene for one hour. The coupon is dried in the oven at 90°C. The clean, dry coupon is placed in a 100ml beaker containing 50ml of a solution of the Example formulation comprising a 0.2% solution of the Example formulation in de-ionised water.  
25 The beaker is covered with a petri dish and placed in a water bath at 90°C for 1 hour. The coupon is then removed, allowed to dry at room temperature and inspected for signs of corrosion or staining. Examples where the coupons show visual signs of corrosion or staining are not  
30 considered effective corrosion inhibitors.

Examination of Table 5 shows that test solutions containing formulations in accordance with the invention

give coupons with no change over the initial clean and polished coupons. By comparison, a blank test with de-ionised water gives a coupon with a severe staining and corrosion showing that formulations according to the invention have corrosion inhibitor properties for mild steel.

**(11) IP 287 Test (Institute of Petroleum Test Designation IP 287/82)**

10

This method measures the rust prevention characteristics of aqueous solutions or emulsions by the chip/filter paper method.

15 Cast iron chips are washed with acetone and dried in the oven at 105°C. The chips are sieved onto a filter paper placed in a petri dish so as to cover a 35mm square with a single layer. 2ml of a test solution prepared by dissolving the example formulation in synthetic hard water  
20 (0.3449 g/l calcium sulphate dihydrate in distilled water) is then pipetted onto the chips so that they are all thoroughly wetted. The dish is covered with a lid and allowed to stand at room temperature for 2 hours. The filter paper is then removed, washed with water and  
25 allowed to dry. The area of staining on the paper is assessed. The test is repeated at various dilutions to determine the point where there is significant increase in stained area. This dilution is known as the break point and is expressed as the dilution (ratio of water to  
30 product) at the break point.

Examination of Table 5 shows that the inventive formulation of Example 3 gives a break point of 30 : 1

proving that the mixture has rust inhibiting properties for cast iron.

#### Aluminium corrosion testing

5

A 70mm x 40mm aluminium test coupon is cleaned by immersion in toluene for one hour and then dried in the oven at 90°C. The clean, dry coupon is placed in a 100ml beaker containing 50ml of test solution comprising 0.2% of an example formulation according to the invention in de-ionised water. The beaker is covered with a petri dish and placed in a water bath at 90°C for 20 minutes. The coupon is then removed, allowed to dry at room temperature and inspected for signs of corrosion or staining.

10

15 Examples where the coupons show visual signs of corrosion or staining are not considered effective corrosion inhibitors.

20

Examination of Table 5 shows that test solutions containing formulations in accordance with the invention give coupons with no change over the initial clean and polished coupons. By comparison, a blank test with de-ionised water gives a coupon with severe staining and corrosion showing that formulations in accordance with the invention show corrosion inhibitor properties for aluminium.

25

#### Copper passive testing

30

#### Copper Strip Tarnish ASTM D 130-75

The test is designed to measure the corrosiveness to copper of the hydrocarbons. Details are given in the

Annual Book of ASTM Standards published by the American Society for Testing and Materials. A clean, dry copper strip is placed in 30ml test solution comprising 0.1% of an example formulation in accordance with the invention in mineral oil containing 100ppm polysulphide and heated for 3 hours at 100°C. Results are determined by comparison with the ASTM Copper Strip Corrosion Standards and giving the appropriate classification.

- 10 Examination of Table 5 shows that the formulation of Example 3 has a 1a classification in both of the mineral oils tested compared with blank ratings of 3b for the mineral oils (containing polysulphide) alone, showing the formulation of Example 3 to be a corrosion inhibitor/passivator for copper.

The results in Table 5 show that formulations of the invention show activity as corrosion inhibitors and metal passivators for ferrous metals, aluminium and copper, both in aqueous and non-aqueous systems.

**Table 1****Examples of Mixtures of the Invention**

Example No.	Compound Type (III)	Parts of (III)	Compound Type (IV)	Parts of (IV)	Mole Ratio (III)/(IV)
1	N-oleoyl sarcosine	10.59	Triazole Derivative A	6	1 : 0.6
2	N-oleoyl sarcosine	10.69	Triazole Derivative A	6.57	1 : 0.65
3	N-oleoyl sarcosine	14.13	Triazole Derivative A	9.33	1 : 0.7
4	N-oleoyl sarcosine	10.59	Triazole Derivative A	6.57	1 : 0.75
5	N-oleoyl sarcosine	7.06	Triazole Derivative A	5.33	1 : 0.8
6	N-oleoyl sarcosine	10.59	Triazole Derivative A	8.49	1 : 0.85
7	N-oleoyl sarcosine	7.07	Triazole Derivative A	6	1 : 0.9
8	N-oleoyl sarcosine	10.09	Triazole Derivative B	5	1 : 0.7
9	N-oleoyl sarcosine	9.2	Triazole Derivative B	5.21	1 : 0.8
10	N-oleoyl sarcosine	12.09	Triazole Derivative B	7.28	1 : 0.85
11	N-oleoyl sarcosine	7.85	Triazole Derivative B	5	1 : 0.9
12	N-lauroyl sarcosine	5.42	Triazole Derivative A	4.66	1 : 0.7
13	N-lauroyl sarcosine	5.42	Triazole Derivative A	6.66	1 : 1
14	N-lauroyl sarcosine	10.84	Triazole Derivative B	7	1 : 0.7
15	N-lauroyl sarcosine	5.71	Triazole Derivative B	5.26	1 : 1

**Table 2****Comparative Examples**

Example No.	Carboxylic Acid	Parts of Acid	Base	Parts of Base	Mole Ratio Acid/Base
18	N-oleoyl sarcosine	7.06	Benzotriazole	1.67	1 : 0.7
19	N-oleoyl sarcosine	7.53	Tolubenzotriazole	2	1 : 0.7
20	N-oleoyl sarcosine	7.06	Triethanolamine	2.09	1 : 0.7
21	Oleic Acid	8.08	Triazole Derivative A	6.67	1 : 0.7
22	Lauroic Acid	5.75	Triazole Derivative A	6.67	1 : 0.7



25

**Table 3****Solubility Tests in Water and Naphthenic Oil**

Formulation of Example No.	Solubility (%)	
	Water*	Naphthenic Oil*
1	ca 0.5	ca 0.3
2	ca 0.5	ca 0.3
3	> 20	ca 2.5
4	> 20	ca 1.0
5	> 20	ca 0.5
6	> 20	ca 0.5
7	> 20	ca 0.5
8	> 20	> 10
9	> 20	> 1.0
10	> 20	> 1.0
11	> 20	ca 1.0
12	> 15	> 1.0
13	> 15	> 1.0
14	> 15	> 5.0
15	> 15	> 1.0
<b>Comparative Example No.</b>		
18	< 1.0	> 2.5
19	< 1.0	> 2.5
20	> 2.0	< 0.5
21	< 0.5	< 0.5
22	< 0.5	< 0.5

**\* Solvents:**

**Water** = Laboratory Grade De-ionised Water

**Naphthenic Oil** = Nynas T 22 supplied by Nynas Naphthenics Limited

26

**Table 4****Solubility Tests in Additional Solvents**

Mixture of Example No.	Solubility (%)				
	Paraffinic Oil*	Gasoline*	Toluene*	PAG*	Ethylene Glycol*
2				> 1.0	
3		> 5.0		> 1.0	
6				> 1.0	
8	> 1.0	> 5.0	> 10	ca 3.0	> 5.0

**\* Solvents**

Paraffinic Oil	=	100 Solvent Neutral Oil supplied by Mobil UK
Gasoline	=	Commercial 95 Octane Esso Unleaded Petrol
Toluene	=	99% Laboratory Reagent Grade
PAG	=	Brcox 50 A20 (RTM) supplied by Inspec UK Ltd
Ethylene Glycol	=	Laboratory Reagent Grade Ethanediol

**Table 5** **Corrosion Inhibitor/Metal Passivator Tests**

Example No.	Fe Corrosion		Al Corrosion Coupon Test	Cu Passivation	
	Coupon Test	IP 287 Test Breakpoint		ASTM D 130 OH 1*	Test Rate OH 2*
Blank (no additive)	Severe corrosion/staining No corrosion/staining		Severe corrosion/staining No corrosion/staining	3b	3b
2					
3	No corrosion/staining	30 : 1	No corrosion/staining	1a	1a
6	No corrosion/staining		No corrosion/staining		
8	No corrosion/staining		No corrosion/staining		

\* Oil 1 = 100 Solvent Neutral Oil supplied by Mobil

\* Oil 2 = 500 Solvent Neutral Oil supplied by Batoye Freedom Group

28

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this  
5 specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and  
10 drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

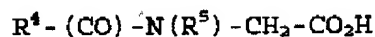
15 Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each  
20 feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extend to any novel  
25 one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A formulation comprising:

5 a) an acyl amino acid derivative of the formula (III):



(III)

10

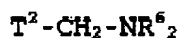
in which

$R^4$  is  $C_8 - C_{30}$  optionally substituted alkyl

and  $R^5$  is hydrogen or methyl, and

15

b) a  $N,N'$ -disubstituted aminomethyl triazole derivatives  
of the formula (IV):



20

(IV)

in which

$T^2$  is an optionally substituted 1,2,3-benzotriazole group,

25 or an optionally substituted 1,2,4-triazole group, and

$R^6$  is a hydroxyalkyl group

2. A formulation according to Claim 1, wherein the  
30 formulation is soluble in organic hydrocarbons.

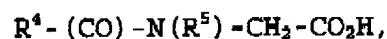
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3. A formulation according to Claim 2, wherein the solubility at 25°C and 1 atmosphere pressure is at least 0.000001wt% in Naphthenic oil.
- 5 4. A formulation according to Claim 2, wherein the solubility at 25°C and 1 atmosphere pressure is at least 0.000001wt% in toluene.
5. A formulation according to Claim 1, wherein the  
10 formulation is soluble in water.
6. A formulation according to Claim 5, wherein the solubility at 25°C and 1 atmosphere pressure is at least 0.000001wt% in water.  
15
7. A formulation according to Claim 1, wherein the formulation is soluble in both water and organic hydrocarbons.
- 20 8. A formulation according to Claim 1, wherein the mole ratio of the formula (III) compound to the formula (IV) compound is from 1 : 0.2 to 1 : 2.
9. A formulation according to Claim 1, which comprises  
25 further additives.
10. A composition comprising:
  - a) a formulation according to any one of the preceding  
30 claims
  - and
  - b) a diluent.

11. A composition according to Claim 9, wherein the diluent is water, organic hydrocarbon, or a mixture thereof.
- 5 12. A composition according to Claim 11, wherein the organic hydrocarbon comprises natural or synthetic aliphatic or aromatic compounds of carbon and hydrogen, optionally containing unsaturated linkages, ester groups or hetero atoms.
- 10 13. A composition according to Claim 11, wherein the organic hydrocarbon is selected from the group comprising:
- 15 octane, kerosine, white spirit, petroleum-based hydrocarbons such as naphthenic oils or paraffinic oils, vegetable oils, synthetic carboxylic acid ester, phosphate esters, poly  $\alpha$  olefins, poly isobutylenes, alkylated aromatic hydrocarbons, ethylene glycol,
- 20 propylene glycol, polyalkylene glycols, glycol ethers.
14. A composition according to Claim 11, wherein water is selected from the group comprising:
- 25 distilled water, de-ionised water, natural water and synthetic hard water.
15. A composition according to Claim 10, in contact with a ferrous metal surface, a non-ferrous metal surface or
- 30 a combination thereof.
16. A kit comprising

32

(a) an acyl amino acid derivative of formula (III):



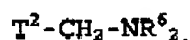
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(III)

and,

(b) a N-N'-disubstituted aminomethyl triazole  
derivative of formula (IV):

10



(IV)

15

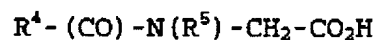
17. A kit according to Claim 16, further comprising a  
solvent comprising water and/or organic hydrocarbon or  
a mixture thereof.

18. A kit according to Claim 16 comprising quantities of  
(a) and (b) in such a ratio that, when mixed together,  
the resulting formulation is soluble in water, organic  
hydrocarbon or a mixture thereof.

19. A method of producing a formulation comprising  
contacting:

(a) an acyl amino acid derivative of formula (III):

30



(III)

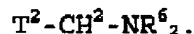


33

and,

(b) a N,N'-disubstituted aminomethyltriazol  
derivative of formula (IV):

5



(IV)

- 10 20. A method according to Claim 19, wherein (a) and (b)  
are contacted in such a ratio that the resulting  
mixture is soluble in water.
- 15 21. A method according to Claim 19, wherein (a) and (b)  
are contacted in such a ratio that the resulting  
mixture is soluble in organic hydrocarbon.
- 20 22. A method according to Claim 19, wherein (a) and (b)  
are contacted by mixing with stirring at an elevated  
temperature.
23. A method according to Claim 19, further comprising  
addition of a diluent.
- 25 24. A method according to Claim 23, wherein the diluent is  
added before stirring at an elevated temperature.
25. A method according to Claim 23, wherein the diluent is  
added during stirring at an elevated temperature.
- 30 26. A method according to Claim 23, wherein the diluent is  
added after stirring at an elevated temperature.

27. Use of a formulation according to any one of the preceding claims, as a corrosion inhibitor, as a rust inhibitor, as a metal passivator, as a metal deactivator, as an emulsifier, as a surfactant or as a multi purpose additive for a combination of the  
5                   aforementioned purposes.

28. Use of a formulation according to Claim 27, wherein a concentration of between 0.000001wt% and 5wt% of the  
10                   formulation are used.

29. A method in inhibiting corrosion of a metal comprising contacting a formulation according to any one of Claims 1-9 and a fluid, which fluid contacts a metal  
15                   susceptible to corrosion.

35


**IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING  
FORMULATIONS**

**Abstract**

5

The present invention relates to formulations for corrosion-inhibiting, emulsifying, lubricating or as a surfactant in organic hydrocarbon and/or water based system containing an acyl amino acid derivative and a triazole derivative.

10

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As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**IMPROVEMENTS IN AND RELATING TO CORROSION INHIBITING FORMULATIONS**

the specification of which ☒ is attached hereto OR ☐ was filed on (MM/DD/YYYY) \_\_\_\_\_ as United States Application Number or PCT International Application Number \_\_\_\_\_ and was amended on (MM/DD/YYYY) \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 356(b) of any foreign application(s) for patent or inventor's certificate, or 356(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
9924358.6	UK	10/14/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/028 attached hereto;

☐ I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/028 attached hereto.

[Page 1 of 2]

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Please type a plus sign (+) inside this box → **+**PTO/59/01 (12-87)  
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**DECLARATION — Utility or Design Patent Application**

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.55 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/59/03C attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Customer Number  OR ☒ Registered practitioner(s) name/registration number listed below

Place Customer Number Bar Code Label here

Name	Registration Number	Name	Registration Number
Richard E. Jenkins	28,428	Jennifer L. Skord	30,687
Jeffrey L. Wilson	36,058	David P. Gloekler	41,037
Aries A. Taylor, Jr.	39,395	Gregory A. Hunt	41,085

☐ Additional registered practitioner(s) named on a supplemental Registered Practitioner Information sheet PTO/59/03C attached hereto.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A person has been filed for this unsigned inventor

Given Name (first and middle (if any))	Family Name or Surname
Arthur Albert	Brady

Inventor's Signature	<i>Arthur Albert Brady</i>	Date	2/9/00
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		Country	UK

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/59/02A attached hereto

Please type a plus sign (+) inside this box ☒

PTO/SS/02A (3-97)

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## DECLARATION

## ADDITIONAL INVENTOR(S)

Supplemental Sheet

Page 1 of 1

Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

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